

ONE HUNDRED FIFTEENTH CONGRESS
Congress of the United States
House of Representatives
COMMITTEE ON ENERGY AND COMMERCE
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MEMORANDUM

March 24, 2017

To: Subcommittee on Digital Commerce and Consumer Protection Democratic Members and Staff

Fr: Committee on Energy and Commerce Democratic Staff

Re: Hearing on “Self-Driving Cars: Levels of Automation”

On **Tuesday, March 28, 2017, at 10:00 a.m. in room 2322 of the Rayburn House Office Building**, the Subcommittee on Digital Commerce and Consumer Protection will hold a hearing titled “Self-Driving Cars: Levels of Automation.”

This hearing is the third in what is expected to be a series of hearings on autonomous vehicles, also known as self-driving vehicles. For more information on the previous two hearings, please refer to the staff memos prepared for those hearings.¹

I. LEVELS OF VEHICLE AUTOMATION

The National Highway Traffic Safety Administration’s (NHTSA) guidance on automated vehicles has adopted the SAE International (previously the Society of Automotive Engineers) definitions of six levels of vehicle automation:²

¹ Memorandum from Democratic Staff to Democratic Members of the House Committee on Energy and Commerce, Subcommittee on Commerce, Manufacturing and Trade, Hearing on Disrupter Series: Self-Driving Cars (Nov. 15, 2016); Memorandum from Democratic Staff to Democratic Members of the House Committee on Energy and Commerce, Subcommittee on Digital Commerce and Consumer Protection, Hearing on Self-Driving Cars: Road to Deployment (Feb. 14, 2017).

² National Highway Traffic Safety Administration, *Federal Automated Vehicles Policy* (Sept. 20, 2016).

- Level 0 – No Automation: The human driver may be informed by warning systems, but performs all dynamic driving tasks without assistance.
- Level 1 – Driver Assistance: An automated system can either steer or accelerate/decelerate the vehicle in some situations, but the human driver performs all remaining driving tasks.
- Level 2 – Partial Automation: An automated system can both steer and accelerate/decelerate the vehicle in some situations, but the human driver performs all remaining driving tasks.
- Level 3 – Conditional Automation: An automated system can perform all dynamic driving tasks in some situations, but the human driver is expected to be able to intervene when necessary.
- Level 4 – High Automation: An automated system can perform all dynamic driving tasks in some situations, even when the human driver is not able to intervene.
- Level 5 – Full Automation: An automated system can perform all dynamic driving tasks in all situations in which a human driver could perform them.³

II. AUTOMOTIVE TECHNOLOGIES CURRENTLY AVAILABLE

Various automated technologies are already being offered in vehicles currently on the market.⁴ Vehicles equipped with front crash prevention systems, which consist of forward collision warning (FCW) and automatic emergency braking (AEB), have been shown to cause fewer rear end crashes and to lower the injury rate in such crashes compared to vehicles without those systems.⁵ Consumer advocates have petitioned NHTSA to require FCW and AEB as standard equipment and that they be implemented as soon as possible.⁶ Instead, in 2016, a voluntary agreement was made with NHTSA, the Insurance Institute for Highway Safety (IIHS), and 20 automakers committing the automakers to make AEB standard on model year 2022 cars.⁷

³ SAE International, *U.S. Department of Transportation's New Policy on Automated Vehicles Adopts SAE International's Levels of Automation for Defining Driving Automation in On-Road Motor Vehicles* (Sept. 22, 2016) (press release).

⁴ *On the Road to Autonomous, a Pause at Extrasensory*, New York Times (Oct. 25, 2013).

⁵ Jessica B. Cicchino, *Effectiveness of Forward Collision Warning and Autonomous Emergency Braking Systems in Reducing Front-to-Rear Crash Rates*, Accident Analysis and Prevention (Feb. 2017).

⁶ Letter from Harvey Rosenfield, Of Counsel, Consumer Watchdog; Clarence Ditlow, Executive Director, Center for Auto Safety; and Joan Claybrook, President Emeritus, Public Citizen to Mark Rosekind, Administrator, National Highway Traffic Safety Administration (May 23, 2016).

⁷ National Highway Traffic Safety Administration, *U.S. DOT and IIHS Announce Historic Commitment of 20 Automakers to Make Automatic Emergency Braking Standard on New Vehicles* (Mar. 17, 2016) (press release).

Adaptive headlights, which rotate to help drivers see around curves, may reduce crash damage and injuries.⁸ Some automakers offer adaptive driving beams, which sense oncoming cars or pedestrians and automatically adjust to avoid glare without reducing brightness, but they are not yet legal in the U.S.⁹ Blind spot detection is being studied for its potential benefits, although research is still inconclusive.¹⁰ IIHS has studied lane-departure warning, but there is no evidence that it prevents crashes.¹¹ Lane-departure prevention systems that actively keep a vehicle in its lane are available as well, but IIHS does not yet have sufficient data to study their effectiveness.¹²

II. WITNESSES

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Kay Stepper, Ph.D.

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⁸ Insurance Institute for Highway Safety, *Adaptive Headlights Help Drivers Spot Objects Earlier; Glare Not Excessive* (Oct. 9, 2014) (www.iihs.org/iihs/sr/statusreport/article/49/7/3).

⁹ *Headlights Get New Attention as More Than a Car Design Flourish*, New York Times (Feb. 16, 2017).

¹⁰ Insurance Institute for Highway Safety, Automation and Crash Avoidance, Crash Avoidance Technologies (www.iihs.org/iihs/topics/t/automation-and-crash-avoidance/qanda#crash-avoidance-technologies) (accessed Mar. 21, 2017).

¹¹ *Tired of the 'Turn Signal Nanny,'* Automotive News (Aug. 29, 2016).

¹² Insurance Institute for Highway Safety, *Crash Avoidance Features Reduce Crashes, Insurance Claims Study Shows; Autonomous Braking and Adaptive Headlights Yield Biggest Benefits* (Jul. 3, 2012) (press release).